DOCUMENT RESUME

ED 460 009 SE 065 544

AUTHOR Hradnansky, Terre A.
TITLE A Family Math Program To Increase Parent Participation in Math Homework in a Primary Multi-Age Classroom.
PUB DATE 1999-08-24
NOTE 47p.; Practicum Nova Southeastern University.
PUB TYPE Dissertations/Theses - Practicum Papers (043)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Assignments; *Computer Uses in Education; Elementary Education; *Family Role; *Family (Sociological Unit); Home Study; Mathematics Education; *Online Systems; *Parent Participation

ABSTRACT

This practicum was designed to increase parental involvement and parental support in the area of interactive mathematics homework by helping parents to better understand their role and responsibilities towards helping their child with the interactive math homework that reinforces the curriculum. Family math meetings were offered and follow-up newsletters were written and distributed to parents. The writer conducted two family math sessions that included a parent education portion, a math materials make-it/take-it portion, and a parent-child interaction portion. During the parent education portion, the writer informed parents about the math curriculum and modeled teaching strategies that support children's mathematical thinking. The families made math materials and parents used the modeled teaching strategies while interacting with their children during the parent-child interaction portion of the meeting. The writer wrote and distributed four math newsletters to increase parent knowledge of both the math curriculum and the use of instructional strategies with interactive math homework activities. The results of the practicum were positive. The data indicated parents used instructional strategies that supported children's mathematical learning during family math meetings and in homework completion. Parent participation in homework increased. Parents reported they had a better understanding of the math curriculum and how to help their child with interactive math homework. (DDR)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 460 009

# A Family Math Program to Increase Parent Participation in Math Homework in a Primary Multi-age Classroom

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
T. Hradnansky
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
1

by
Terre A. Hradnansky
Cluster 89

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
X This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

A Practicum I Report Presented to
the Ed.D. Program in Child and Youth Studies
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

Nova Southeastern University
1999

BEST COPY AVAILABLE

SE 063 544

APPROVAL PAGE

This practicum took place as described.

Verifier: Christopher Steinhauser

Area C Superintendent

Title

Long Beach, California

Address

August 13, 1999

Date

This practicum report was submitted by Terre A. Hradnansky under the direction of the adviser listed below. It was submitted to the Ed. D. Program in Child and Youth Studies and approved in partial fulfillment of the requirements for the degree of Doctor of Education at Nova Southeastern University.

Approved:

24 August 1999

Date of Final Approval of Report

Roberta Wong Bouverat

Roberta Wong Bouverat, Ph. D., Adviser

Acknowledgments

The writer wishes to thank all the people who made this practicum possible. Thanks are due to the families and students, together we all learn better. Thanks are also due to the other multi-age teacher at her school and the practicum verifier for professional and moral support during the practicum process, and to the practicum adviser for guidance and patience throughout the stages of the practicum. The writer especially wants to thank her family who were quietly supportive of the practicum process even though it took a tremendous amount of time from family activities.

Table of Contents


| | Page |
|---|---|
| Acknowledgements | iii |
| Abstract | vi |
| Chapter I: Introduction | 1 |
| Description of Community | 1 |
| Writer's Work Setting | 1 |
| Writer's Role | 3 |
| Chapter II: Study of the Problem | 4 |
| Problem Statement | 4 |
| Problem Description | 4 |
| Problem Documentation | 5 |
| Causative Analysis | 6 |
| Relationship of the Problem to the Literature | 8 |
| Chapter III: Anticipated Outcomes and Evaluation Instruments | 14 |
| Goals and Expectations | 14 |
| Expected Outcomes | 14 |
| Measurement of Outcomes | 14 |
| Chapter IV: Solution Strategy | 16 |
| Discussion and Evaluation of Solutions | 16 |
| Description of Selected Solutions | 20 |
| Report of Action Taken | 20 |
| Chapter V: Results | 23 |
| Results | 23 |
| Discussion | 25 |
| Recommendations | 27 |
| Dissemination | 28 |
| References | 29 |

Appendices

A Family Math Session Observational Checklist ..... 32
B Family Math Session Parent Survey ..... 34
C Family Math Newsletter Parent Survey ..... 36
D Resources for Family Math Sessions and Interactive Math Activities ..... 38

Tables

1 Interactive Behaviors Observed During Family Math Sessions ..... 24

Abstract

A Family Math Program to Increase Parent Participation in Math Homework in a Primary Multi-age Classroom. Hradnansky, Terre A., 1999: Practicum Report, Nova Southeastern University, Ed.D. Program In Child and Youth Studies. Mathematics/ Elementary/ Homework/ Curriculum and Instruction/ Parent-School Relationship/ Parent Education/ Critical Thinking/ Problem Solving/Interactive Math.

This practicum was designed to increase parental involvement and parental support in the area of interactive mathematics homework by helping parents to better understand their role and responsibilities towards helping their child with the interactive math homework that reinforces the curriculum. Family math meetings were offered and follow-up newsletters were written and distributed to parents.

The writer conducted two family math sessions that included a parent education portion, a math materials make-it/take-it portion, and a parent-child interaction portion. During the parent education portion, the writer informed parents about the math curriculum and modeled teaching strategies that support children's mathematical thinking. The families made math materials and parents used the modeled teaching strategies while interacting with their children during the parent-child interaction portion of the meeting. The writer wrote and distributed four math newsletters to increase parent knowledge of both the math curriculum and the use of instructional strategies with interactive math homework activities.

The results of the practicum were positive. The data indicated parents used instructional strategies that supported children's mathematical learning during family math meetings and in homework completion. Parent participation in homework increased. Parents reported they had a better understanding of the math curriculum and how to help their child with interactive math homework.

*******

Permission Statement

As a student in the Ed.D. Program in Child and Youth Studies, I do (X) do not ( ) give permission to Nova Southeastern University to distribute copies of this practicum report on request from interested individuals. It is my understanding that Nova Southeastern University will not charge for dissemination except to cover the costs of microfiching, handling, and mailing of the materials.

_____ _____

(date) (signature)

# Chapter I: Introduction

## Description of Community

The community in which the practicum occurred was located in the western United States. The community was located in a large urban city whose multi-cultural make-up was approximately 13% Asian, 13% African-American, 25% Hispanic and 50% Caucasian. The service industry was the community's largest employer, followed by the manufacturing and retail industries. Approximately 27% of the children under 18 years of age lived under the poverty level. The local public school district enrollment was 118,000 students in grades pre-school through 12th grade. Many students were bused from their home school neighborhoods to relieve overcrowding and to achieve voluntary desegregation. The school district had a policy that students may attend their school of choice with priority given to the neighborhood school children. Most children in this neighborhood did attend their home school.

The immediate school community was composed of middle and low-income families. The school neighborhood was stable and there was little transition due to families moving. Many of the residents were families with children and working parents. Tree-lined streets and single-family homes characterized the setting.

## Writer's Work Setting

The work setting was a kindergarten through fifth grade public school originally built in 1951. The school had additional buildings and bungalows added to accommodate student growth. The school's mission statement was to provide each child with a strong foundation in academic skills with the belief that all students could learn and become responsible. The school had a science lab with a certificated science specialist, a

Resource Specialist Program (RSP), a Reading Recovery program, and a school library equipped with a research computer lab. Each of these programs supported the school's mission statement.

The school had 37 classes, with 20 students per class for the primary grades, and 35 students per class for the fourth and fifth grades, as per state guidelines for class size. There were two primary, multi-age classes, five classes each at the kindergarten, first, second, and third grades, three fourth grade, and four fifth grade regular education classes. There was also one Spanish bilingual/transitional class in each grade kindergarten through fourth, and three self-contained Special Day Classes serving pre-school age through fifth grade.

The educational environment at the school perpetuated academic growth and the Principal's List and Honor Roll recognized students. Good attendance was encouraged and awards were given monthly for recognition. Stop, Think, and Act Responsibly (STAR) awards were given to students daily to recognize good behavior, and Citizen of the Month awards were given monthly.

The student population of the school was diverse. School enrollment was approximately 775 students, the make-up of which was 40% Hispanic, 35% White, 15% African-American, and 10% other ethnic groups. Approximately half of the students were bused from distant school neighborhoods to relieve overcrowding, and the remainder of the students were either neighborhood children or children transported by their parents for school of choice.

The school staff included a principal, facilitator, counselor, 40 certificated teachers, and 13 full or part-time non-certificated staff members. There was also a half-time nurse, a psychologist one day a week, a librarian three days a week, and a full-time RSP teacher and speech specialist on staff. A media assistant serviced the library one day a week, most regular classes had a college aide for four hours a week, and the special education classes had at least one full-time aide.

Writer's Role

The writer had several roles and responsibilities in the school. The writer taught 20 kindergarten to second grade students in a self-contained classroom. The writer developed, implemented, and modified curriculum and instruction to meet the diverse needs of all the students. Conferencing with parents regarding student progress was part of the writer's responsibility. The writer also served as a team member on various school and district level committees.

## Chapter II: Study of the Problem

### Problem Statement

The problem to be solved in this practicum was that parents did not understand their role and responsibilities towards helping their child with the interactive math homework that reinforced the curriculum.

### Problem Description

The problem that existed in this writer's work setting was that parent involvement was low when interactive mathematics homework was assigned. Students were not receiving the parental support necessary to complete their mathematics homework. In order for students to complete interactive math homework, adult supervision, participation, and interaction with the child was necessary. The students were returning homework incomplete or not attempted. The policy was that homework was assigned on Tuesday and was to be returned the following Tuesday. Parents were encouraged to call, write, or visit if they had questions or needed assistance. The student and parent checked off completed assignments and signed that they completed the homework. Math homework was being returned as complete even when it was incomplete. Non-interactive, repetitive worksheet type homework could have been assigned, but the writer felt it did not reinforce the math concepts of the current curriculum, nor did children learn higher-level math skills in that manner. The purpose of the interactive math homework was for the child and parent to interact, and in the process of this interaction the child's thought about math concepts would be clarified and strengthened through an exchange of dialogue and activity. The homework activities that were assigned were in the form of

children's games that had been played at school. Basic math facts were memorized and math concepts were reinforced through these games and activities.

Parents were expected to assist their children with the interactive homework, so the parents were affected by the problem. The students were also affected by the problem because they were not receiving the parental support necessary to complete the homework. One of the solutions to the problem that had been tried was training the students in using the games and activities prior to assigning it as homework. The writer felt this solution wasn't successful because perhaps parents were unsure how to assist their child with homework that was different than when they attended school. Another solution was to assign only homework that students could complete independently, in the form of worksheets. This solution was not acceptable because it did not reinforce the current curriculum, and students were performing busy work instead of thoughtful work.

Problem Documentation

The evidence of the problem in the work setting was found through a variety of sources. School records were one source of documentation. Homework papers indicated that 6 out of 18 parents checked off and signed "We have worked together to complete this weeks homework. We have completed all assignments and checked them off", but on the other hand, the homework was incomplete. Parent questions and statements on the comment section of homework papers indicated parents had questions about helping their children with interactive math homework. Office records indicated that when parents were polled school-wide, parents requested parent education meetings, with help specifically in the area of Mathematics curriculum and helping children at home. The

writer followed up with an informal classroom survey that indicated 14 of 20 parents requested information on how to help their children at home with mathematics.

Teacher anecdotal records were another source of documentation. The records indicated that 13 parents requested assistance and/or clarification on interactive math homework at least once during the school year. In addition, students who handed in incomplete math homework responded verbally with comments that parents were not helping them. Examples of comments were "My (parents) didn't know how to do it", "We don't have (materials)", or "My (parents) said they don't know why we have to do math like this". This documentation was evidence that supported the problem that parents wanted to help their children at home with math homework but did not understand how to do so.

Causative Analysis

There appeared to be several causes related to the problem in the work setting. First, parents may not have felt comfortable or competent to assist their child with the math homework. Parents were asking for assistance and clarification on math homework assignments and on helping their child at home with mathematics. Students were verbally saying their parents weren't helping them because the parents didn't know how to do the work. The students were familiar with the homework activities because they had been practicing them at school, but parents were still unsure as to how to proceed with the work. This presumed that homework directions were unclear, parents were questioning why the homework was being assigned, or both were related to the cause of the problem.

Second, students were reporting verbally that parents were saying the required materials were not available. The homework instructions included suggestions for materials that could be found in the home to support the homework activities, and at times the materials had been sent home with the students. Homework was still being returned incomplete or not attempted, so a possible cause was that parents were not relating everyday math in the home to school math.

Statements written by parents on the comment section of homework papers indicated parents wanted to see the students learning more rote, memorization, and traditional worksheet type of homework. Parents elaborated on the comments at parent conferences, making statements that when they did math in school, they were required to memorize math facts and prove they knew them by completing pages of math problems. Some parents also related that either the parent or their child did not have the natural ability to do math as some people did, putting the child at a disadvantage when it came to learning math. A third probable cause of the problem was that parent and student beliefs about mathematics affected their performance and expectations.

Teachers and students were required to follow national, state, and district guidelines in teaching and learning mathematics. Much of the focus was on open-ended mathematics. Arriving at more than one answer and being able to verbally express and defend how one arrives at solutions placed an emphasis on the process more than the product. A fourth possible cause of the problem was that historically, mathematical learning had a different focal point than current mathematical standards of expected achievement.

Relationship of the Problem to the Literature

A broad literature review was conducted in the areas of parent involvement, homework, parent-school relationship, attitudes towards mathematics, and elementary mathematics curriculum and instruction, as these related to the parental involvement with interactive math homework problem area. Electronic searches were performed on the ERIC, PsychInfo, and Eisenhower National Clearinghouse for Mathematics and Science Education databases. This list was supplemented by searching the reference sections of retrieved documents for additional research pieces. The review of literature was limited by focusing on current research from 1989 to the present.

There was much research and literature that supported the practicum problem of parent involvement in the general areas of homework and parent education. A majority of the research that studied parental involvement did so in the context of higher student achievement. Russell (1996) found several factors contributing to high student achievement in relation to parent influence. Resources, such as books in the home, had a positive effect on student achievement. High achievers were generally children who were encouraged by parents to spend time on constructive learning activities outside of school time. Children were higher achievers when parents had high standards of expectancy for achievement. Children's achievement was higher when their parents were involved in their academic instruction, such as homework.

Shaver and Walls (1998) studied the effect of parent involvement with Chapter I students in the academic areas of reading and mathematics. The results of the study indicated that school programs that encouraged parental involvement were likely to see

student achievement gains regardless of socioeconomic status or student gender. Shaver and Walls also found that younger students' parents were more involved in parent activities. Younger students were also more likely to make greater gains in achievement in reading and math than older students were. The study supported the importance of the parent-school connection to improve the success of children in mathematics, especially in the primary grades.

The literature supported evidence that lack of participation by parents in their children's education is related to the parent-school relationship. Russell (1996) reported barriers existed to prevent parent involvement. Parents felt uninformed about new curriculums and programs. Teachers wanted parents to become involved in their child's education, but parents felt disconnected and alienated toward the schools. Some parents thought the schools had unconsciously constructed cultural and language barriers toward them. Some parents did not participate because they did not feel welcomed. De La Cruz (1999) worked with Latino families, and several factors were found to limit participation of parents in the area of mathematics. The math curriculum was language based, so it placed an emphasis on both oral and written language, which was difficult for second language parents and students. Parents felt limited English speaking students needs weren't being met because many teachers did not have the strategies to work effectively with the second-language students. Communication between the school and home was limited, the teachers were concerned about the lack of participation of the Latino families, but the teachers did not know how to build partnerships with these families. Epstein (1990) found parents wanted information on how to help children at home with

homework, but weren't sure if they were doing the right things. Parents wanted to be informed of school practices and wanted to be involved but weren't sure how.

One of the causes of the problem that was supported by the literature was that parents questioned the current math curriculum and instruction being used in the classroom. The National Council of Teachers of Mathematics (1989) recommended that students learn to value mathematics, become confident in their ability to do mathematics, become problem solvers, learn to communicate mathematically, and learn to reason mathematically. These goals were in sharp contrast to traditional goals and objectives for students in mathematics. Traditionally rote learning, algorithms, and direct instruction were the main focus of the mathematics instructional program (Rowan & Bourne, 1994). Meyer, Delagardelle, & Middleton (1996) found that parents misunderstood the philosophy of problem solving in the newer mathematics curriculum. Parents in Ames, Iowa were invited to school meetings, given information about the new constructivist math curriculum, and encouraged to give their parental concerns about the curriculum. The concerns generated fell into five categories. There were parents who supported the program and wanted parent education classes so that they, the parents, could help their children. Another concern was parents viewed the problem solving focus as improving their child's self esteem, but didn't view the curriculum challenging because it didn't emphasize the basics. A third concern was the implementation of the new program progressed faster than staff development, and the parents viewed the teachers as being unprepared to teach the curriculum. A fourth concern was that parents felt their children were being used as an experiment and they did not trust the curriculum nor the materials

used to implement the program. Lastly, parents preferred the traditional way of teaching and learning mathematics, the way the parents learned when they attended school. The new constructivist math curriculum was in direct contrast to the traditional emphasis on the basics and the parents were concerned.

Orman (1993) found that parents were not knowledgeable about the current mathematics curriculum and instructional techniques even after demonstrations and explanations during conferences and open house. Parents needed to understand current methods so they could help their children in math at home. Parents were confused on how to help their children with newer math methods, so parents used the traditional methods they learned in school to help their child in math homework. The difference in teaching methods between home and school confused the children (Balli, 1998; Tregaskis, 1991). Research indicated parents wanted to help their children with math at home, but did not understand how to do so (Ashlock, 1990). Russell (1996) used parent focus groups from seven cities across the United States to identify issues in parent involvement in science and math. Parents reported they felt uncomfortable working with their child in the area of mathematics. Parents were aware that mathematics was taught in different ways than when they were in school, and they were uncomfortable with the changes in the math curriculum, which affected their participation. De La Cruz (1999) worked with Latino families and found that parents wanted to help their children at home with math homework. Parents didn't understand the math curriculum and didn't think they had enough knowledge to help their children. Parents felt helpless, even when their children were in the primary grades.

Another cause of the problem that Ensign (1998) supported was that school and home mathematics were usually separated and did not work together to complement and reinforce each other. Often the mathematical learning environment that existed naturally at home was overlooked or negated. Anderson (1998) found that parents and children engaged in mathematics in the home at an early age, yet many parents and teachers did not easily recognize those informal experiences as supporting mathematical learning. Parents believed mathematics learning began when children entered school and were assigned formal arithmetic. Ensign asked parents and students to describe a mathematical experience at home that was related to math being learned at school and discovered that students found math problems in the home that were more challenging than the math problems being assigned at school. Still, parents reported they had trouble relating the school math with home math.

The literature supported parent attitudes towards math impact children's attitudes about math. Hartog and Brosnan (1994) stated that a child's attitude toward mathematics was influenced by parental attitudes towards the subject. Parents who were enthused and excited about math in everyday situations were likely to have children who developed an enthusiasm for math. Stanic (1989) found parents had a strong influence on their child's attitude toward mathematics and children tended to adopt their parents' beliefs about achievement. Morse and Wagner (1998) cautioned that parent perceptions of mathematics and mathematical learning was driven by the parents' mathematical ability and history, and often drove parent requests about preferred teaching techniques. Morse and Wagner conducted a mathematical seminar for parents that asked parents to recall

their own mathematical histories. Parents were asked to recall what mathematics meant to them as children. Parents' memories of mathematical experiences in school influenced their own perceptions of mathematics and mathematical learning. Rowan & Bourne (1994) and Williams (1991) said American parents often believed that natural mathematical aptitude, instead of effort, determined who would succeed in math. Williams advised that the best thing parents could do was to let their children know they could succeed in math with sufficient effort.

The literature review indicated that parent attitudes towards mathematics, their comfort level with the subject, and the methods utilized in teaching mathematics to children affected parent involvement in mathematics with their children at home.

## Chapter III: Anticipated Outcomes and Evaluation Instruments

### Goals and Expectations

The goal of the practicum was that parents would understand their role and responsibilities towards helping their child with interactive math homework that reinforced the mathematics curriculum.

### Expected Outcomes

The following outcomes were projected for this practicum:

1. Ten of 20 families will attend family math meetings as indicated on the sign-in sheets.
2. Each family will demonstrate at least two behaviors as identified on the Family Math Session Observational Checklist (see Appendix A).
3. Seventeen of 20 parents will acknowledge that they have a better understanding of the math curriculum as reported on parent surveys (see Appendices B & C)..
4. Seventeen of 20 parents will acknowledge that they have a better understanding of how to help their child at home with interactive homework as reported on parent surveys (see Appendices B & C).
5. Along with completed interactive homework, 15 of 20 parents will check off, sign, and return the parent participation portion of the homework.

### Measurement of Outcomes

The writer measured outcome number one by counting the number of families in attendance as recorded on the meeting sign-in sheets. Attendance at meetings was

deemed important because the math meetings allowed an exchange of ideas and explanations about the current math curriculum and interactive math homework. Outcome number two was measured by analyzing the written observational checklist (see Appendix A) and anecdotal records. The writer observed families during the practice portion of the math meetings and documented the active participation behaviors necessary for success in completing interactive math homework activities. The third and fourth outcome were measured by analyzing and tallying the responses to brief, written surveys (see Appendices B & C) completed by parents. The surveys asked open-ended and multiple-choice questions about parent understandings of the math curriculum and interactive homework in completing the homework activities. For the fifth outcome the writer checked homework completion and parent signatures on the interactive math homework to make sure the homework was completed with parental interaction and involvement.

## Chapter IV: Solution Strategy

### Discussion and Evaluation of Solution

This practicum addressed the problem that parents did not understand their role and responsibilities towards helping their child with the interactive math homework that reinforced the curriculum. A review of the literature was conducted to generate possible solutions to the problem. The topic areas researched for the solution strategy were parent education, homework, parental involvement, elementary mathematics curriculum and instruction, parent-school relationship and attitudes towards mathematics. The review was limited by focusing on research from 1989 to the present. Several researchers addressed similar problems with solutions from which the writer was able to glean ideas.

Some researchers found that providing activities and resources to parents encouraged positive attitudes in math. Hartog & Brosnan (1994) noted that increased emphasis on students learning higher-level math skills necessitated parental involvement to meet this goal. Family Math was recommended as a parental involvement program because it addressed equity issues in math, encouraged math problem solving and communication skills, and helped parents to develop positive attitudes in math when working with their children. Brodsky, Fish, Gross, and Urso (1994) found that parents who attended family math nights learned math differently at the meetings than they had in school and were less fearful of math. Some parents said they were confused and didn't like math prior to the math nights, but found math fun and interesting after attending the meetings. Parents reported that their child was more enthusiastic about math and found math fun and interesting after the math nights.

Russell (1996) found that students whose parents were directly involved in their homework were more successful academically than students who received instruction primarily at school. Familiarizing parents with current teaching practices in mathematics and enabling parents to assist their children in homework return was accomplished by Mills (1989) through parent newsletters and parent workshops. Orman (1993) provided backpacks that contained open-ended math activities and instructions. Backpacks went home with the students for a specified number of days along with a backpack journal. Parents and children completed the activities and commented in the journal. Many families commented on how much they enjoyed the active learning the backpacks offered. Goldstein and Campbell (1991) showed parents specific math activities to use with their child. Parents were told the child's ability level, shown specific activities that reinforced math skills at that level, and were given the materials for the activities. Derrington (1993) offered a family learning night that targeted activities on concept building and reasoning ability skills that could be reinforced at home. In general, researchers found that teachers who provided math activities and materials to use in the home encouraged parent involvement in their children's math education.

Hartog, Diamantis, and Brosnan (1998) found that parents and teachers who worked cooperatively together in math teaching enabled children to see the importance of math and this increased the likelihood that the children, too, would place importance on math. Math activities that were a daily part of life were recommended, such as cooking, grocery shopping, and comparison of prices and quantities. These activities involved parents in a meaningful way in their child's math education and communicated the

importance of math. De La Cruz (1999) found that communicating to parents in their primary language, sending home math activity books, and offering parent workshops at times that were convenient to families encouraged parents to work cooperatively with the school. Ehnebuske (1998) reported that math reform and parent participation were the reasons for implementing a district-wide kindergarten and 1st grade parent involvement program in math homework. The program used to accomplish this goal was IMPACT, an acronym for "Inventing Maths for Parents and Children and Teachers". The math activities families completed at home supported and guided math lessons learned at school. Parents reported that they looked forward to and enjoyed working on specific math activities with their children at home.

The writer generated several solutions from the review of the literature. One type of strategy was to provide families with math materials to use in the home. Ehnebuske (1998) and Tregaskis (1991) provided math materials, games, and instructions that were open-ended to families. Allen (1990) suggested providing families with a math manipulative library and Orman (1993) suggested sending materials along with directions for their use. A second strategy often used was offering parent education in mathematics. Derrington (1993) suggested offering parent education that encouraged parents to teach and reinforce math concepts and higher level thinking skills at home. Goldberg (1990) offered math workshops that emphasized hands-on activities and materials to take home. Epstein (1994) and Hartog and Brosnan (1994) suggested offering parental involvement programs that helped develop positive attitudes toward math. A third solution strategy suggested by Ensign (1998) and Epstein was to connect everyday math to the school

curriculum through suggested math activities applicable to the home setting. Finally, a fourth strategy was to initiate positive contacts with parents in the form of notes, phone calls, home visits, and parent education (Russell, 1996).

The writer evaluated the solutions and ideas that were generated from the literature to determine if they were feasible given the problem setting, the population affected, and the available resources. Since many parents were not using games and manipulatives to reinforce math concepts in an open-ended and interactive way, the solution of homemade games and materials accompanied by instructions was a feasible solution. A math manipulative lending library was a good idea, but was not feasible due to the lack of resources. Connecting everyday math to the school curriculum was a practical way to involve parents in reinforcing the math curriculum at home, and it was a realistic and workable solution. The writer decided to continue to initiate positive parental contacts in the form of notes, phone calls, and conferences. In addition, the writer initiated parent education in the area of math to encourage positive attitudes towards math and a better understanding of the math curriculum. The writer offered math workshops that emphasized hands-on activities and materials to take home that reinforced the math curriculum. Much of the assigned math homework emphasized reinforcing math concepts and higher level thinking skills that reinforced the math curriculum, so parent education in this area was thought to be beneficial. Finally, since some parents and students had made comments negating their mathematical abilities, the writer offered a family math involvement program to help develop positive attitudes towards math.

Description of Selected Solutions

The writer implemented a solution that represented a unique combination of ideas gleaned from the literature. The solution was also based on the analysis and evaluation of the writer's own ideas. The solution was to offer two family math sessions over a twelve- week period. Each session included a parent education portion (Derrington, 1993), a math materials make-it/take-it portion (Goldberg, 1990), and a parent-child interaction portion within each session. On-going parent support and follow-up was in the form of newsletters (Mills, 1989).

The solution was justifiable because homework records and teacher anecdotal records indicated that some parents and students expressed mathematical abilities in negative terms, the necessary materials to complete homework activities were sometimes unavailable in the home, and some parents were not knowledgeable about current mathematics curriculum and instruction. Parent attendance at the family math sessions, which included parent education, make-it/take-it, and parent-child interaction components, and the follow-up newsletters, increased parent ability to assist their children with interactive math homework and helped develop positive attitudes towards math in parents and children.

Report of Action Taken

The writer scheduled two family math sessions, sending invitations to families two weeks in advance of the scheduled meetings. The agenda and activities for the first family math session focused on using homemade dice, cards, and board games that reinforced the district math content standards in algebra, logic and language, and number

sense. One inch wooden cubes were pre-cut and marked with the numbers 1-6, 7-12, minus and plus signs, greater than, less than, and equal to signs, and a blank die for families to customize, for a total of 5 wooden dice total. Dominoes, number card sets, and a simple blank game board for families to customize, all printed on tagboard weight paper for strength and durability, were also prepared in advance for the make-it/take-it portion of the family math workshop. The agenda for the second family math session focused on measurement activities, including recipes for gorp (an edible snack), playdough, and goop (a cornstarch and water mixture), and hopping, jumping, and car race activities. These activities were directly related to activities carried out in the home and reinforced the district math content standards in the areas of logic and language, and measurement. All ingredients for making the recipes and materials for measuring were gathered and made available for the make-it/take-it portion of the second family math workshop. Reminder notes were sent home a couple days before each family math meeting.

Both family math meetings began with an activity the families made for use later in the session. The second portion of the meetings included information about the district and state math curriculum, demonstration of sample activities related to the target content standard areas, and modeled techniques on how to interact with and support children with mathematical thinking during interactive math work. The last portion of the meetings was devoted to parent-child interaction practice time working on interactive math activities using the modeled strategies. The writer filled out an observational checklist and made anecdotal notes (see Appendix A) on how families implemented the modeled

strategies. The parents completed a short, written survey (see Appendix B) that supplied information to the writer for evaluation of the meetings and for planning the follow-up newsletters.

In addition to the family math workshops, four follow-up newsletters were written and distributed by the writer over the twelve-week period. Two newsletters followed the first family math session and focused on activities that reinforced the areas of algebra, logic and language, and number sense, and the last two newsletters followed the second family math session and focused on activities that reinforced the areas of logic and language, and measurement. A short written survey (see Appendix C) was also distributed along with the newsletter and interactive homework packets, which provided feedback on the newsletters and activities, and guided the writing of future newsletters and activities. Ideas for Family Math Session and Newsletter activities were gleaned from the literature. Resources that were particularly helpful are included in Appendix D.

# Chapter V: Results

## Results

The problem in this writer's work setting was that parents did not understand their role and responsibilities towards helping their child with the interactive math homework that reinforced the math curriculum. The selected strategy included two family math meetings that included a parent education portion, a math materials make-it/take-it portion, and a parent-child interaction portion within each session. Four follow-up newsletters provided activities and support for parents in the targeted math curriculum areas of logic and language, algebra, number sense, and measurement. The goal of the practicum was that parents would understand their role and responsibilities towards helping their child with interactive math homework that reinforced the mathematics curriculum. The expected outcomes and their results follow.

1. Ten of 20 families will attend family math meetings as indicated on the sign-in sheets.

This outcome was not met.

The first family math meeting had 10 of 19 families attending, and the second family math meeting had 8 of 19 families attending. There were only 19 students enrolled during the practicum, a decrease of 1 from the original projected number of 20 students.

2. Each family will demonstrate at least two behaviors as identified on the Family Math Session Observational Checklist (see Appendix A).

This outcome was met.

All families attending the Family Math Sessions demonstrated two or more behaviors during the parent child interaction portion of the sessions. Tallies of the number of families demonstrating interactive behaviors observed in each session are presented in Table 1.

Table 1

Interactive Behaviors Observed During Family Math Sessions

| | Families Demonstrating | | | |
|---|---|---|---|---|
| Session Number | 2 Behaviors | 3 Behaviors | 4 Behaviors | 5 Behaviors |
| Session One | 2 | 2 | 3 | 3 |
| Session Two | 0 | 3 | 1 | 4 |

3. Seventeen of 20 parents will acknowledge that they have a better understanding of the math curriculum as reported on parent surveys (see Appendices B & C).

This outcome was met.

There were a total of 19 students enrolled instead of the projected enrollment of 20 students. A total of 18 parents acknowledged that they had a better understanding of the math curriculum as reported on the parent surveys. The one parent who did not acknowledge a better understanding of the math curriculum indicated she was not sure if the Family Math Session or Newsletters helped her to better understand the math curriculum. She did not elaborate on the open-ended survey question as to what information she still required for better understanding.

4. Seventeen of 20 parents will acknowledge that they have a better understanding of how to help their child at home with interactive homework as reported on parent surveys (see Appendices B & C).

This outcome was met.

There were a total of 19 students enrolled instead of the projected enrollment of 20 students. A total of 18 parents acknowledged that they had a better understanding of how to help their child at home with interactive homework as reported on the parent surveys. The one parent who did not acknowledge a better understanding of how to help her child at home with interactive homework indicated she was not sure if the Family Math Session or Newsletters helped her to better understand the interactive math homework. She did not elaborate on the open-ended survey question as to what information she still required for better understanding.

5. Along with completed interactive homework, 15 of 20 parents will check off, sign, and return the parent participation portion of the homework.

This outcome was met.

A total of 18 parents checked off, signed, and returned the parent participation portion of the homework.

Discussion

All of the outcomes, except number one, were met. The practicum took place at the end of a school year, and the writer had difficulty choosing a date for the second family math session that wouldn't conflict with other school and family events. Parents who attended wrote positive comments on the Family Math Session Parent Survey

question number three "Did you enjoy the Family Math Session? Why or why not?" (see Appendix B). Sample comments included: "Gathering together as a group helps to better understand the subject." and "I always enjoy being as a family with the class. It does a lot for the morale for the kids and parents." Several parents wrote "I enjoyed it (family math session) because it was fun!" Parent comments were positive in response to the Family Math Newsletter Survey question number five "What did you like best and/or least about the math activities? Why?" (see Appendix C). Sample responses included: "It was fun for the child." "I liked the three different versions (of the game) because I could choose the right one for my kid." and "I like killing two birds with one stone-spending time together and having fun doing homework." The parent responses were consistent with Brodsky, Fish, Gross, and Urso's (1994) research on family math nights and positive parent and child attitudes about math. A total of 18 out of 19 parents responded "yes" when asked if the information and activities presented at the meetings or in the newsletter helped them to better understand the math curriculum (see Appendix B, question 1 and Appendix C, question 2). The "yes" responses suggest that parents increased their knowledge of the math curriculum, a curriculum that emphasized teaching and learning higher level thinking skills as opposed to drill and memorization of facts. This practicum data supports Hartog and Brosnan's (1994) and Mills' (1989) research which focused on parental involvement to increase students learning higher-level math skills. A few parents stated they were asking more open ended questions when working with their child on math activities at home, which was consistent with the writer's documented observations of families during the meetings. Hartog, Diamantis, and

meetings. Hartog, Diamantis, and Brosnan (1998) recommended involving parents in math activities that were a daily part of life. Parent comments such as, "I learned activities which are used in everyday life to help with math." and "He (my son) can help me cook or bake and learn math skills at the same time." are evidence that math sessions and newsletters helped them connect math to everyday life activities.

A total of 18 parents checked off, signed, and returned the parent participation portion of the homework, but three parents added that they found the Family Math Newsletter Parent Survey repetitive or redundant. In reviewing the individual newsletter survey responses, the writer gathered valuable information from each survey and the writer was able to adjust and modify future newsletter activities based on that information. This would not have been possible without including a survey per math session or newsletter.

In summary, the results of this practicum were positive. Family Math Sessions and Family Math Newsletter activities helped parents to understand their role and responsibilities towards helping their child with interactive homework that reinforced the curriculum.

Recommendations

Upon completion of this practicum the following recommendations were generated:

1. Regular family nights focusing on curriculum content and supporting activities should be offered throughout the school year because the families who participated expressed interest in the information, were enthused with the

2. A parent education portion focused on modeling specific techniques on how to interact with and support children's learning should be included in family night sessions because parents want to help their children but do not always know how to go about doing so.
3. Some parents expressed regret that the practicum was implemented the latter part of the school year. It is the writer's recommendation that similar programs be implemented by the middle of the school year so that parents will have more time to utilize the information presented, and to prevent conflict with end of the school year activities.

Dissemination

The writer plans to disseminate the ideas and findings of the practicum on a local level through school and district level meetings, and on a broader level through professional organization conferences. The writer has already presented sample activities from the family math sessions and the math interactive homework at a regional and state Association for the Education of Young Children (AEYC) conference. Conference attendees were interested in references that were particularly helpful in creating family math activities. In addition, a couple of the writer's colleagues requested copies of the family math session and interactive math homework handouts after hearing about the practicum at an informal gathering. The writer will continue to present the practicum ideas and findings at future AEYC gatherings and conferences, as well as through school parent organizations, such as the PTA.

References

Allen, R. (1990). Development of a math manipulative parent/teacher training program for remediating elementary Chapter I students (Ed. D. Practicum, Nova University, 1990). (ERIC Reproduction Service No. ED 325 399)

Anderson, A.G. (1998). Parents as partners: Supporting children's mathematics learning prior to school. Teaching Children Mathematics, 4 (6), 331-337.

Ashlock, R. (1990). Parents can help children learn mathematics. Arithmetic Teacher, 38 (3), 42-46.

Balli, S.J. (1998). When mom and dad help: Student reflections on parent involvement with homework. Journal of Research and Development in Education, 31 (3), 142-146.

Brodsky, S., Fish, M., Gross, A., & Urso, J. (1994). An urban family math collaborative (Report No. CASE-09-94). New York: Center for Advanced Study in Education. (ERIC Document Reproduction Service No. ED 379 154)

De La Cruz, Y. (1999). Reversing the trend: Latino families in real partnerships with schools. Teaching Children Mathematics, 5 (5), 297-300.

Derrington, M.L. (1993). Enrichment in the mathematics and science curriculum in the primary grades. School Science and Mathematics, 93 (1), 1-4.

Ehnebuske, J. (1998). In the comfort of their own homes: Engaging families in mathematics. Teaching Children Mathematics, 4 (6), 338-343, 351.

Ensign, J. (1998). Parents, portfolios, and personal mathematics. Teaching Children Mathematics, 4 (6), 346-351.

Epstein, J. (1994). Family math that's above average: Take home activities for kids and their parents. Instructor, 103 (8), 17-18, 22.

Epstein, J. (1990). School and family connections: Theory, research, and implications for integrating sociologies of education and family. Marriage and Family Review, 15 (1-2), 99-126.

Goldberg, S. (1990). Developing and implementing a parental awareness program to enhance children's mathematical performance and attitude (Ed.D. Practicum, Nova University, 1990). (ERIC Document Reproduction Service No. ED 327 383)

Goldstein, S., & Campbell, F.A. (1991). Parents: A ready resource. Arithmetic Teacher, 38 (6), 24-27.

Hartog, M.D., & Brosnan, P.A. (1994). Doing mathematics with your child (RR 93002013). Washington, DC: Office of Educational Research and Improvement. (ERIC Document Reproduction Service No. ED 372 967)

Hartog, M.D., Diamantis, M., & Brosnan, P. (1998). Doing mathematics with your child. Teaching Children Mathematics, 4 (6), 326-330.

Meyer, M.R., Delagardelle, M.L., & Middleton, J.A. (1996). Addressing parents' concerns over curriculum reform. Educational Leadership, 53 (7), 54-57.

Mills, J. (1989). Increasing parental awareness of the importance of math homework for third grade students (Ed.D. Practicum, Nova University, 1989). (ERIC Document Reproduction Service No. ED 310 921)

Morse, A., & Wagner, P. (1998). Learning to listen: Lessons from a mathematics seminar for parents. Teaching Children Mathematics, 4 (6), 360-364, 375.

National Council of Teachers of Mathematics. (1989). Curriculum and Evaluation Standards for School Mathematics. Reston, VA: Author.

Orman, S.A. (1993). Mathematics backpacks: Making the home-school connection. Arithmetic Teacher, 40 (6), 306-308.

Rowan, T., & Bourne, B. (1994). Thinking like mathematicians: Putting the K-4 NCTM standards into practice. Portsmouth, NH: Heinemann.

Russell, R. (1996). Science and mathematics education reform: What do parents need to know to get involved? (Report No. ISBN-0-87168-590-6). Washington, DC: American Association for the Advancement of Science. (ERIC Document Reproduction Service No. ED 400 182)

Shaver, A.V., & Walls, R.T. (1998). Effect of Title I parent involvement on student reading and mathematics achievement. Journal of Research and Development in Education, 31 (2), 90-97.

Stanic, G. (1989). Parental involvement in a time of changing demographics. Arithmetic Teacher, 37 (4), 33-35.

Tregaskis, O. (1991). Parents and mathematical games. Arithmetic Teacher, 38 (7), 14-16.

Williams, L. (1991). Help children succeed in math and science. PTA Today, 16 (5), 16-18.

# APPENDIX A

## FAMILY MATH SESSION

## OBSERVATIONAL CHECKLIST

FAMILY MATH SESSION
OBSERVATIONAL CHECKLIST

Family name_____ Date_____

- ☐ Parent and child are talking to each other about the math activity.

- ☐ Child is explaining his/her own thought processes while working with their parent on the math activity.

Parent and child are both working on the math activity, with the parent using modeled strategies such as:

- ☐ Parent is explaining his/her own thought processes while working with their child on the math activity.

- ☐ Parent is allowing wait time for child to answer and/or participate.

- ☐ Parent is asking modeled open-ended questions, such as how did you get that answer, after their child completes an activity or gives an answer.
  - ☐ Acceptance of all answers
  - ☐ 'How did you get your answer?'
  - ☐ 'Can you show me?'
  - ☐ 'Tell me what you were thinking.'
  - ☐ 'Does it make sense? Why (or why not)?'
  - ☐ 'Can you do it another way?'

ANECDOTAL NOTES:

APPENDIX B

FAMILY MATH SESSION

PARENT SURVEY

FAMILY MATH SESSION PARENT SURVEY

Dear Parents,
Please take a few moments to help evaluate the Family Math Sessions. If you have questions, please feel free to contact me. Thank you, in advance, for your continued support of our program.

Terre Hradnansky

**********

Please return the survey as soon as possible. Thanks.

**********

1. Did the information and activities at the Family Math Session help you to better understand the math curriculum?

_____Yes _____No _____Not sure

In what way(s) did the session help you better understand the math curriculum, or what information do you still require for better understanding?

2. Did the information and activities at the Family Math Session help you to better understand how to help your child at home with interactive homework?

_____Yes _____No _____Not sure

In what way(s) did the session help you better understand how to help your child, or what information do you still require for better understanding?

3. Did you enjoy the Family Math Session? Why or why not?

4. What did you like best and/or least? Why?

4. Additional comments you would like to make:

APPENDIX C

FAMILY MATH NEWSLETTER

PARENT SURVEY

# FAMILY MATH NEWSLETTER PARENT SURVEY

Dear Parents,
Please take a few moments to help evaluate the Family Math Newsletter. If you have questions, please feel free to contact me. Thank you, in advance, for your continued support of our program.

Terre Hradnansky

**********

Please return the survey as soon as possible. Thanks.

**********

1. Did you help your child with the interactive math homework?
   _____Yes _____No _____Sometimes

   Please explain.

2. Did the newsletter give you a better understanding of the math curriculum?
   _____Yes _____No

In what way(s) did the newsletter help your understanding of the math curriculum, or what additional information do you require?

3. Did the newsletter give you a better understanding of how to help your child with interactive homework?
   _____Yes _____No

In what way(s) did the newsletter help you better understand how to help your child, or what additional information do you require?

4. In general, do you think your child does better in math when you help him/her with their math interactive homework?
   _____Yes _____No _____Sometimes

   Please explain.

5. What did you like best and/or least about the math activities? Why?

6. Additional comments you would like to make:

# APPENDIX D

# RESOURCES FOR FAMILY MATH SESSIONS

# AND

# INTERACTIVE MATH ACTIVITIES

# RESOURCES FOR FAMILY MATH SESSIONS AND INTERACTIVE MATH ACTIVITIES

## Bibliography

Burns, M. (1994). Math by all means: Place value grades 1-2. White Plains, New York: Math Solutions Publications.

Burns, M. (1992). About teaching mathematics: A K-8 resource. White Plains, New York: Math Solutions Publications.

Burns, M. & Tank, B. (1988). A collection of math lessons from grades 1 through 3. White Plains, New York: Math Solutions Publications.

Crawford, J. (1996). Math by all means: Money grades 1-2. White Plains, New York: Math Solutions Publications.

Kamii, C. (1994). Young children continue to reinvent arithmetic- 3rd grade: Implications of Piaget's Theory. New York: Teachers College Press.

Kamii, C. (1989). Young children continue to reinvent arithmetic- 2nd grade: Implications of Piaget's Theory. New York: Teachers College Press.

Kamii, C. (1985). Young children reinvent arithmetic: Implications of Piaget's Theory. New York: Teachers College Press.

Kamii, C. (1982). Number in preschool and kindergarten. Washington, D.C.: National Association for the Education of Young Children.

Tank, B. (1996). Math by all means: Probability grades 1-2. White Plains, New York: Math Solutions Publications.

Additional Resources

AIMS Educational Foundation
P.O. Box 8120
Fresno, CA 93747-8120

Telephone: 1-888-733-2467
FAX: 209-255-6396

http://www.AIMSedu.org

EQUALS and Family Math Programs
Lawrence Hall of Science
University of CA
Berkeley, CA 94720-5200

Telephone: 1-800-897-5036
FAX: 510-643-5757

http://equals.lhs.berkeley.edu/

Marcy Cook Math Materials
P.O. Box 5840
Balboa Island, CA 92662

Telephone: 714-673-5912
FAX: 714-673-7909

NCTM (National Council of Teachers of Mathematics)
1906 Association Drive
Reston, VA 20191-1593

Telephone: 1-800-235-7566
703-620-9840
FAX: 703-476-2970

http://www.nctm.org